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ABSTRACT

The research presented in this paper shows that the norm-referenced grades assigned by teachers are significantly related to the students' self concept assessments and mental health status. Data from a sample of 318 fifth grade students of lower, middle, and upper socio-economic classes indicate that some of the influence which norm-referenced grades can have on students' psychological development can be beneficial, but these grades can also subject students' self concepts and mental health to unnecessary risk. Employing criterion referenced evaluation procedures and mastery learning strategies may reduce this risk, the author believes. Multiple regression analysis was used to investigate the relationships among (1) predictor variables: grades and achievement test performance; (2) criterion variables: twelve indices of self concept and five mental health scores; and (3) control variables: IQ, social class, sex, age, level of aspiration, duration of attendance at present school, and other measures of classroom evaluation. The author suggests that modifying evaluation methods can provide an important avenue for dealing with the extensive personality problems found in our schools. (Author/SES)

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# THE RELATIONSHIP OF EVALUATIONS OF STUDENTS' COGNITIVE PERFORMANCE TO THEIR SELF CONCEPT ASSESSMENTS AND MENTAL HEALTH STATUS

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## INTRODUCTION

The marks that a student receives from his teacher have a greater impact on his self concept and his mental health than do his standardized achievement test scores. Although teachers' marks and achievement test scores are often considered equivalent measures of a student's academic performance, the research reported here indicates that they can have significantly different effects on his psychological development.

In most classrooms, the evaluations that the student receives from his teacher are his most consistent and frequent source of information about how well he is achieving. Most students take standardized achievement tests, but many are never told how they performed. Students who are aware of their achievement test results usually do not receive their scores as often or as publically as they receive marks from their teachers.

Because these marks play such an important role in the student's world, they are the measure which he and those around him use to determine how well he is achieving in school. Ann Boehm and Mary Alice White (4) investigated criteria which students use to evaluate their achievement in school. They found that students used the marks they received on their report cards as the basis for their own judgments of how well or badly they had done in school. Even when the students were unclear about the meaning

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of their marks, they used those marks to determine their status in the classroom. Teachers' marks were the accepted standard of achievement in the classroom.

The form of evaluation which is accepted in the student's own environment is the form which will affect his psychological development, according to psychological theory. Kurt Lewin (14) maintained that the information which has the greatest effect on a person's behavior is that which is significant within his "lifespace," consisting of the person and his environment as it exists for him. According to Robert W. White (18), a person's concept of his own competence is influenced both by the way he evaluates himself and the way significant other people evaluate him. As he learns how significant others evaluate him, he is influenced to perceive himself in the same way. Erik Erikson (5,6) proposed that active mastery of one's own environment is essential for a healthy personality. For the person of school age, the tasks to be mastered in the classroom correspond to the tasks to be mastered for healthy psychosocial development. Students who believe that they are competent to acquire the skills and knowledge presented at school can develop a "sense of industry" and avoid a "sense of inferiority, the feeling that one will never be 'any good'" (6, p. 125). In sum, a person's self concept and mental health are strongly influenced by evaluations which are significant to him in his own environment. A positive self concept and good mental health prepare the person to master the tasks of his environment and, thus, receive positive evaluations. The person's self concept, mental health and the evaluations he receives for his performance interact, each influencing the development of the other.

In the classroom, the two most common methods of evaluating students' academic performance are teachers' assessments and standardized achievement

tests. Although teachers evaluate students' performance in many ways, the work of Boehm and White (4) indicates that students consider marks on report cards to be the most significant form of evaluation. Teachers' marks play a more significant role in the classroom than do achievement test scores. The effect which achievement test scores have on students' judgments of their academic competence may be due to the effects which teachers' knowledge of those scores have on the marks they assign. While the effect of students' marks on their psychological development is direct, the effect of their achievement test scores on their self concepts and mental health may be mediated through their grades. Based on this analysis and the theories of Lewin, White and Erikson, it was proposed that students' marks would be more strongly and directly related to their self concepts and mental health than their achievement test scores were.

Both the achievement test scores and the teachers' grades included in this study were norm-referenced measures. According to Robert Glaser (8), norm-referenced measures assess a student's standing along a continuum of attainment relative to the other members of a particular group. Glaser maintained that most achievement measures currently employed in education are norm-referenced.

Teachers' grades and achievement test scores do not always produce similar assessments of students' academic achievement. Norm-referenced grades often contain evaluations which are not included in achievement test scores. Research has shown that teachers' grades can be influenced by subjective factors such as students' appearance, sex, conformity to institutional norms and attitudes toward their work. In addition, grades which teachers give can be affected by their own fatigue, variations in evaluative criteria and characteristics which they perceive inaccurately in their students. Standardized achievement test scores are not likely to

be influenced by these factors. Normative grades are usually based on the performance of students in one class or school. Standardized achievement test scores are usually based on a much larger standardization sample. These two measures can produce different scores because they represent ranks in different norm groups.

Thus, teachers' grades can contain an element which is not common to achievement test scores. When students use their grades to determine their status in the classroom even though they are unaware of the meaning of those grades, this element of grades unrelated to achievement test performance functions as a significant form of evaluation in the students' own environment. It was proposed that the element of students' normative grades which was not related to their achievement test performance would be related to their self concepts and mental health.

> Hypothesis: Grades will remain a significant predictor of students' self concept assessments and of their mental health status when the effects of achievement test scores and other evaluation measures are removed. Achievement test scores will not predict students' self concept assessments and mental health status when the effects of grades are removed.

SAMPLE

The sample consisted of 318 fifth grade students of lower, middle and upper socio-economic classes. Fifteen classes of students in six school districts participated. It was not possible to employ random procedures in the sample selection.

PROCEDURE INSTRUMENTATION

The following measures were obtained for each student:

1) Fifth grade teacher's grades. Mean grade point average of grades in academic subjects given in the middle of fifth grade were used. Data collection did not begin until several weeks after the marking period so that the grades were known to the students and their parents.

2) Achievement Test Performance. Students' grade equivalent scores on the Stanford Achievement Test were used.

3) Self Concept. The "Self Concept Inventory" constructed by Pauline Sears (15) was used. Sears' (15) work with the Self Concept Inventory showed an acceptable level of reliability (.79 to .95). Sears suggested that its structure could be explained adequately by one factor. This proposition concerning the factor structure was tested using principal component analysis and Joreskog's versions of unrestricted and restricted maximum liklihood factor analysis (11,12). This analysis confirmed the hypothesis that the self concept data can be grouped into twelve factors corresponding to twelve subscales of the Self Concept Inventory. Correlations among the twelve factors ranged from .004 to .63. The magnitude of these correlations indicates that the factors represent distinct but related aspects of self concept. The twelve factors account for 77 percent of the variance.

This analysis suggested the following method of scoring the Self Concept Inventory. Each of the factors was considered an index of self concept, and a student's score on the index was his factor score. The indices were named: Athletics, Learning, Boys, Girls, Appearance, Teacher, Work Habits, Others, Self, School Subjects, Improvement, Rating.

Further analysis of the Self Concept Inventory is in progress. In addition, the author has revised the Inventory for use with preschool and primary students in a group setting. Results of this research will be reported elsewhere.

4) Mental Health. Mental health was measured by two methods which were validated using individual clinical mental health assessments (16). First, the classroom teacher stated whether each student had shown atypical evidence of symptoms of emotional disturbance in each of four categories:

Antisocial Behavior, Developmental Problems, Intrapersonal Distress and Interpersonal Ineptness. The number of symptoms attributed to each student in each category composed four measures, hereinafter referred to as Symptom Counts. Second, the teacher made ratings of each student's mental health status on a four point scale: Well adjusted, No significant problems, Moderately maladjusted, Clinically maladjusted, hereinafter referred to as Mental Health Rating.

5). Social Class. The occupation and education of the primary wage earner in the family were used to determine social class (10). A separate measure was obtained for each student.

6) Intelligence. Students' scores on standardized intelligence tests were obtained from school records.

7) Sex, age, duration of attendance at present school, amount of education to which the student aspired. These variables were measured by students' responses to questionnaire items.

8) Other Measures of Classroom Evaluation. Students responded to questionnaire items concerning 1) the sources (e.g. teachers' verbal report, classmates' opinions, own opinions, grades, and test performance) they and their parents used to evaluate their work and 2) their parents' reactions to positive and negative evaluations of their school work.

DATA ANALYSIS

The present study investigated the effects on students' self concepts and mental health of 1) grades independent of achievement test performance and 2) achievement test performance independent of grades. Multiple regression analysis was used to investigate the relationships among the predictor variables: grades and achievement test performance, the criterion variables: 12 indices of self concept and 5 mental health scores (4 Symptom Counts and 1 Mental Health Rating), and the control variables: IQ, social class, sex, age, level of aspiration, duration of

attendance at present school, other measures of classroom evaluation. Since the hypothesis was based on propositions concerning effects within each classroom, deviations from class means were taken for all subjects on all variables.

Two multiple regression analyses were performed. In both analyses, the effect of the preceding main effect variable was held constant before the succeeding main effect variable was entered. Chi square was used to test the significance of the contribution of each predictor variable to the prediction of all criterion variables simultaneously after the effects of the preceding predictor variables were removed. Step-down F tests were used to test the significance of the relationship between the predictor variable and each criterion variable independent of other criterion variables and, in a separate analysis, after the effects of the preceding criterion variables had been removed (7).

In the first multiple regression analysis, achievement test performance was entered as the first main effect variable, each control variable was entered as a separate main effect, and grades was entered as the last main effect variable. This analysis investigated the effect on self concept and mental health of grades independent of achievement and the control variables. The second analysis was identical to the first except that grades was entered as the first main effect variable and achievement test performance was entered as the last main effect variable. This analysis investigated the effect of achievement independent of grades and the control variables.

RESULTS

The results showed that students' grades had an effect on their self concepts and mental health which was independent of their achievement test performance, but students' achievement test performance did not have an effect on their self concepts and mental health which was independent of

their grades.

As shown in Table 1, students' grades were significantly related to their self concept assessments and mental health status when the effects of their achievement test performance and the control variables had been removed. The univariate F tests showed that grades remained significantly ($p < .05$) related to Improvement, Rating, Learning, Teacher, Work Habits, Others, School Work Self Concepts and to all of the Mental Health measures.

The step-down F tests indicated that grades remained significantly related to Mental Health Rating and Symptoms of Intrapersonal Distress when the effects of the relations of students' grades and achievement tests to their self concept assessments were removed. The relationship between grades and mental health remaining when the effects of self concept were removed may be partly methodological. Both grades and mental health were measured by teachers' judgments. Also, children participating in the study were relatively healthy, since few psychotic children are found in the average fifth grade classroom. Further investigation of the relationships among grades, achievement test scores, self concepts and mental health is now being conducted by the author. Clinical judgments by psychologists are being used as an additional measure of mental health.

Table 2 shows that achievement test performance did not significantly predict students' self concepts and mental health when the effects of grades and the control variables were removed. The F tests showed that Athletics Self Concept is the only criterion variable significantly ($p < .05$) related to achievement, and the amount of variance accounted for by achievement is small (1.5%). The relationship of achievement test performance to students' self concepts and mental health has been accounted for by grades and the control variables.

This study included a large number of control variables. To insure that the control variables did not account for the findings, a multiple

regression analysis similar to the one reported above but omitting the control variables was performed. The predictions by grades of self concept and mental health when achievement was removed were similar to those reported in Table 1. Achievement was shown to be a significant predictor of self concept and mental health after the effect of grades was removed. But achievement did not account for a substantial proportion of the variance of any of the criterion variables in addition to the portion accounted for by grades. The largest percentage of the variance accounted for by achievement after grades was removed was 2% of Improvement, Athletics and Appearance Self Concepts, respectively. This analysis showed that almost all of the variance of self concept and mental health predicted by achievement test performance was also predicted by grades. But all of the variance of self concept and mental health predicted by grades was not predicted by achievement test performance.

Since the theory underlying this research proposed that grades and self concept and mental health were interacting variables, the strength of self concept and mental health as predictors of grades was analyzed. Multiple regression analysis was used. Grades were entered as the criterion variable; the 12 self concept scores and the five mental health scores were predictor variables. Results showed that self concept predicted 37% of the variance of grades; mental health predicted 44% of the variance of grades; self concept and mental health taken together predicted 57% of the variance of grades. These results are particularly noteworthy in view of the fact that IQ was shown to predict only 38% of the variance of grades.

## DISCUSSION

This study supports three conclusions. First, it shows that the grades which a student receives from his teacher on his report cards are a significant form of evaluation in his environment. As such, they interact

self concept assessments and his mental health status. Both the regression and the correlational analyses confirmed the existence of significant relationships among students' grades and their self concepts and mental health. In fact, the relationship of students' self concepts and mental health to their grades was shown to be as strong as the relationship between students' IQ scores and their grades. These findings add to the empirical work supporting the theories of Lewin, White and Erikson. The results bring to light the major role which students' grades can play in influencing their self concept assessments and mental health status as well as their future academic performance.

A second conclusion supported by the results is that there exists an element of students' grades, independent of their achievement test scores, which is significantly related to their self concepts and mental health. The present research does not supply clues to the composition of that element, and this topic is worthy of further research. However, one can use the results of prior research to speculate about the components contributing to this element of grades which is independent of achievement test performance.

There is extensive research which shows that teachers include subjective factors, unrelated to actual academic performance, in the grades they give students. Since this research is reviewed elsewhere (17) and will be reported extensively in a forthcoming book by this author, only a brief summary is presented here. Researchers have found that students tend to receive higher grades, regardless of their actual achievement, if they have personality characteristics similar to those of the teacher, if they are girls, if they behave well in school, if they have strong super-egos

and are able to delay gratification, if they are not too creative and imaginative, and if they attend school regularly and appear interested in what goes on in the classroom. Researchers have also found extensive variations in the academic standards which teachers use to assign grades. For example, Kirby (13) found that the average grades assigned by the college professors in his sample ranged from 1.8(C-) to 3.9(B+). Bass (1) found that grade point averages in a single university ranged from 3.5(B+) for graduate students to 2.4(C+) for freshmen and sophomores. Studies have shown that a single example of academic work is likely to receive a variety of grades if it is graded by several teachers or if it is regraded by the same teacher after a period of time has elapsed. Teachers who graded work when they were tired were found to increase either the leniency or the strictness of their standards. Any of these factors could have added a subjective element to the teachers' grades.

Although grades and standardized achievement test scores in this study were both norm-referenced evaluation measures, the evaluations they produced represent ranks in different reference groups. Grades are usually derived by ranking students in one class or school. The grades are often "curved" so that a few students receive high grades, most students receive average grades, and a few students receive low grades (3). Standardized achievement test scores, on the other hand, are based on a larger standardization sample which is often selected in an attempt to represent the national population. In this study, class means of achievement test scores ranged from grade equivalents of 4.1 to 6.0. Class means of grades showed a smaller range. Some classes with high mean grades had low mean achievement test scores, and some classes with low mean grades had high mean achievement test scores. Under these conditions, a single grade, for example a "B", can

represent a high achievement test score in one class and a lower achievement test score in another class.

Other factors can account for differences found between grades and achievement test scores. One such factor is error in both methods of measurement. Another factor is the possibility that the teachers based their grades on somewhat different academic content than the content evaluated by the achievement test.

The element of norm-referenced grades which is independent of achievement test performance is significantly related to students' self concepts and mental health no matter what its composition may be. It can be caused by teachers' assessments of subjective criteria, variations in grading standards, variations in reference groups used to establish evaluations, variations in content being evaluated, measurement error or other factors not considered here. The composition of this element of grades has not been determined conclusively. But there is evidence that students use their grades to determine their academic status even when they are unclear about their meaning. If teachers' assessments of subjective criteria and the other factors discussed here are responsible for the element of grades which is independent of students' achievement test scores, these factors are influencing students' self concepts and mental health through the effects they have on students' grades.

The third conclusion supported by the results is that standardized achievement test scores do not have an effect on students' self concepts and mental health which is independent of their grades. Although students' grades and achievement test scores did not produce identical scores, the element of achievement test scores, independent of grades, was not significantly related to students' self concepts and mental health when

the effect of grades was removed. Achievement test scores were significantly related to students' self concepts and mental health before the effects of grades were removed. These results support the interpretation that the effect of students' achievement test scores on their self concepts and mental health is mediated through their grades.

Teachers are usually aware of their students' test scores, and they can include this information in the grades they assign. Although achievement test scores are not communicated regularly and frequently to students, these scores can affect students indirectly through the influence they have on teachers' grades.

The present research suggests that factors which teachers evaluate when they determine their students' grades will have significant effects on students' psychological development because those grades play a very significant role in the classroom. Evaluations of academic work which are not important in the classroom will not have a direct effect on students' psychological development, no matter how accurate those evaluations may be. Norm-referenced evaluation procedures which teachers use to determine students' marks should be given careful scrutiny.

## CONCLUSION

Norm-referenced grading prescribes high grades for some and low grades for other students in every norm group, usually one class or school. The present research indicates that high grades can encourage students to develop positive concepts of themselves and good mental health. On the other hand, low grades can lower students' self concept assessments and mental health status. When low grades are inaccurate or excessively negative, students' self concepts and mental health can be subjected to unnecessary risk.

Criterion-referenced evaluation procedures may avoid some of the psychological risks inherent in norm-referenced grading. Criterion-referenced evaluation assesses the extent to which each student has attained the acceptable standard of performance (8). Benjamin Bloom (3) recommended that the student should be considered to have mastered a learning task when he has attained the level of performance adequate for his own purposes. Requiring each student to achieve perfect performance on each learning task can waste time and have other harmful consequences. Each student should receive a positive evaluation for each task he masters.

The objectives of the instruction should be clearly defined. A variety of instructional methods and materials should be available to meet the needs of individual students. Scheduling should be flexible because students will require varying amounts of time to attain mastery. Each student's progress should be diagnosed frequently. These diagnostic evaluations should be used to identify the material the student has not yet learned so that he can be given instruction appropriate to his needs. If these diagnostic evaluations are given grades, the student must have the option of omitting these grades from his final grade in the unit or course (2).

Emphasizing criterion-referenced evaluation and mastery of criteria of acceptable performance can be beneficial to students. Each student receives positive evaluations for the work he has mastered. When only norm-referenced methods are used, students at the bottom of the curve may never be told that their work is acceptable. The negative evaluations each student receives are accompanied by constructive criticism and concrete instructions for learning material he missed. Norm-referenced evaluation procedures cannot provide this information unless the strengths and weaknesses

of each student's learning are evaluated in addition to the determination of his rank in his norm group. Determining each students' strengths and weaknesses is not required when norm-referenced measures are used.

The present research showed that the norm-referenced grades assigned by teachers are significantly related to students' self concept assessments and mental health status. Some of the influence which norm-referenced grades can have on students' psychological development can be beneficial, but these grades can also subject students' self concepts and mental health to unnecessary risk. Employing criterion referenced evaluation procedures and mastery learning strategies may reduce this risk.

Schools have the power to modify their evaluation procedures. It is much easier for the school to modify its evaluation methods than to change other factors which can contribute to psychological disturbance, such as the student's home environment. Since students' grades are significantly related to their self concepts and mental health, modifying evaluation methods can provide an important avenue for dealing with the extensive personality problems found in our schools.

TABLE 1

STEP-WISE REGRESSION TO ANALYZE THE CONTRIBUTION OF GRADES AFTER THE EFFECTS OF ACHIEVEMENT TEST SCORES AND THE CONTROL VARIABLES HAVE BEEN REMOVED

CHI-SQUARE* = 105.4796 D.F. = 17 PROBABILITY LESS THAN 0.0001

| | Variable | Univariate F | Probability Less Than | Step Down F | Probability Less Than |
|---|---|---|---|---|---|
| | 1. Improvement | 8.9921 | 0.0030 | 8.9921 | 0.0030 |
| | 2. Rating | 4.5341 | 0.0341 | 3.4292 | 0.0651 |
| | 3. Athletics | 1.1316 | 0.2884 | 0.0275 | 0.8685 |
| | 4. Learning | 34.0920 | 0.0001 | 25.3721 | 0.0001 |
| | 5. Boys | 2.4147 | 0.1213 | 0.0786 | 0.7794 |
| Self | 6. Girls | 0.1211 | 0.7282 | 0.0032 | 0.9546 |
| Concept | 7. Appearance | 0.0818 | 0.7751 | 5.9624 | 0.0153 |
| | 8. Teacher | 9.2673 | 0.0026 | 0.0765 | 0.7824 |
| | 9. Work Habits | 23.0666 | 0.0001 | 2.7976 | 0.0956 |
| | 10. Others | 7.0167 | 0.0086 | 1.7570 | 0.1861 |
| | 11. Self | 0.9811 | 0.3228 | 3.1595 | 0.0766 |
| | 12. School Work | 19.9100 | 0.0001 | 1.2550 | 0.2636 |
| | 13. Mental Health Rating | 70.7982 | 0.0001 | 49.3770 | 0.0001 |
| | 14. Antisocial Behavior | 13.6735 | 0.0003 | 0.7469 | 0.3883 |
| Mental | 15. Developmental Problems | 3.8804 | 0.0499 | 1.3670 | 0.2434 |
| Health | 16. Intrapersonal Distress | 38.2209 | 0.0001 | 6.4153 | 0.0119 |
| | 17. Interpersonal Ineptness | 8.4221 | 0.0040 | 0.0813 | 0.7758 |

D.F. = 1. and 289.

*Chi-square was used to test the significance of the contribution of grades to all of the dependent variables simultaneously.

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TABLE 2

STEP-WISE REGRESSION TO ANALYZE THE CONTRIBUTION OF STANDARDIZED ACHIEVEMENT TEST SCORES AFTER THE EFFECTS OF GRADES AND THE CONTROL VARIABLES HAVE BEEN REMOVED

CHI-SQUARE = 15.5983 D.F. = 17 PROBABILITY LESS THAN 0.5525

| | Variable | Univariate F | Probability Less Than | Step Down F | Probability Less Than |
|---|---|---|---|---|---|
| | 1. Improvement | 3.1896 | 0.0752 | 3.1896 | 0.0752 |
| | 2. Rating | 0.3860 | 0.5350 | 0.5910 | 0.4427 |
| | 3. Athletics | 5.1461 | 0.0241 | 3.9924 | 0.0467 |
| | 4. Learning | 1.6759 | 0.1965 | 1.8541 | 0.1744 |
| | 5. Boys | 1.7749 | 0.1839 | 0.3248 | 0.5693 |
| Self | 6. Girls | 0.1147 | 0.7351 | 0.1933 | 0.6606 |
| Concept | 7. Appearance | 0.4242 | 0.5154 | 0.1195 | 0.7299 |
| | 8. Teacher | 0.0016 | 0.9686 | 0.2736 | 0.6014 |
| | 9. Work Habits | 0.5452 | 0.4609 | 0.2580 | 0.6120 |
| | 10. Others | 0.0125 | 0.9110 | 0.0130 | 0.9093 |
| | 11. Self | 0.3369 | 0.5622 | 1.1036 | 0.2944 |
| | 12. School Work | 0.0303 | 0.8620 | 0.6950 | 0.4053 |
| | 13. Mental Health Rating | 0.3341 | 0.5638 | 0.2187 | 0.6405 |
| Mental | 14. Antisocial Behavior | 0.5428 | 0.4619 | 1.3044 | 0.2545 |
| Health | 15. Developmental Problems | 0.0828 | 0.7737 | 0.1287 | 0.7201 |
| | 16. Intrapersonal Distress | 0.0005 | 0.9822 | 0.0027 | 0.9586 |
| | 17. Interpersonal Ineptness | 3.0896 | 0.0799 | 1.5612 | 0.2126 |

D.F. = 1. and 289.

*Chi-square was used to test the significance of the contribution of achievement tests to all of the dependent variables simultaneously.

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